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Phase II Environmental Site Assessment Update

1655 Carling Avenue
Ottawa, Ontario

Prepared For

Surface Developments

October 11, 2019

Report: PE4229-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA Update was conducted for 1655 Carling Avenue, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in areas of potential environmental concern (APECs) on the Phase II Property. The subsurface investigation consisted of sampling groundwater from existing wells.

Information presented in previous engineering reports identified soil impacted with PHC and PAH concentrations exceeding the MECP Table 7 standards, present across the eastern half of the Phase II Property.

Groundwater, impacted with Benzene and PHC concentrations exceeding the MECP Table 7 standards, is present across the eastern third of the subject site. Concentrations of several PAHs compounds also marginally exceed the MECP Table 7 standards for groundwater, across the eastern third of the subject site.

Conclusion

Based on the findings of the Phase II ESA, soil and water have been found to be impacted by PHCs, benzene and PAHs. While the impacted soil and groundwater does pose a liability to the subject land, it is our opinion that it does not pose a risk to the current operation of the property. Given the sources of the contamination (former on-site AST and off-site UST) are no longer present, the groundwater contaminants may naturally degrade over time. If the property is redeveloped in the future, then remediation of the affected soil and groundwater should be conducted in conjunction with redevelopment.

It is expected that groundwater monitoring wells will be abandoned in accordance with O.Reg.903, at the time of construction excavation. It is recommended that the integrity of the monitoring wells be maintained, for possible further groundwater monitoring purposes or that they are decommissioned according to Ontario Regulation Reg. 903 (Ontario Water Resources Act).

1.0 INTRODUCTION

At the request of Surface Developments, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment for 1655 Carling Avenue, in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address areas of potential environmental concern (APECs) identified on the Phase II Property, during the Phase I ESA conducted by Paterson in October 2019.

1.1 Site Description

Address:	1655 Carling Avenue, Ottawa, Ontario.
Property Identification Number:	04012-0101.
Location:	The subject site is located on the north side of Carling Avenue, around 75 m west of the intersection between Carling Avenue and Churchill Avenue, in the City of Ottawa Ontario.
Latitude and Longitude:	45° 22' 48" N, 75° 44' 54" W;
Configuration:	Rectangular.
Site Area:	0.35ha (approximate).

1.2 Property Ownership

The current registered property owner of 1655 Carling Avenue is Surface Developments. Paterson was retained to complete this Phase II ESA by Mr. Jakub Ulak of Surface Developments. Surface Developments office is located at 88 Spadina Avenue, Ottawa, Ontario.

1.3 Current and Proposed Future Uses

The subject site is currently a gravel-surfaced parking lot. It is our understanding that a portion of the subject site will be redeveloped with a residential high-rise building founded on 2 levels of underground parking. It is expected that the basement parking garage would be fully tanked to avoid long term water taking.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 7 of the document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", prepared by the Ministry of the Environment, Conservation and Parks (MECP), April 2011. The MECP selected Table 7 Standards are based on the following considerations:

- ❒ Shallow soil conditions (less than 2 m of overburden above bedrock)
- ❒ Non-potable groundwater conditions
- ❒ Coarse-grained soil conditions
- ❒ Residential land use.

The residential standards were selected based on the proposed future use of the subject site. Coarse-grained soil standards were chosen as a conservative approach. Grain size analysis was not completed.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is located in a residential and commercial area. The site is relatively flat and at grade with the adjacent properties. The regional topography is relatively flat with a slight downward slope to the west. Site drainage consists primarily of infiltration and runoff to catch basins on Carling Avenue.

2.2 Past Investigations

Paterson completed a Phase I ESA in October 2019 for the subject site. Based on the Phase I ESA, the historical review indicated one (1) Potentially Contaminating Activity (PCA) on the subject site; an AST located in the Basement of the former Aladdin Motel/West Park Motor Inn motel. In addition, twelve (12) PCAs were identified in the subject area. These comprise the various RFOs located at the intersection between Carling Avenue and Churchill Avenue, the UST located at 1619 carling Avenue, Minutemen Press Printers, the Sheridan Equipment property and various muffler and auto service centres. The PCAs that represent Areas of Potential Environmental Concern (APECs) on the Phase I Property as well as Contaminants of Potential Concern (CPCs) are presented in Table 1.

Table 1: Areas of Potential Environmental Concern				
Area of Potential Environmental Concern (APEC)	**Location of APEC with respect to Phase I Property**	**Potentially Contaminating Activity (PCA)**	**Contaminants of Potential Concern (CPC)**	**Media Potentially Impacted**
AST located in the basement of the former motel	The central portion of the site	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	PHCs, BTEX	Soil/ Groundwater
Former UST located at 1619 Carling Avenue	Eastern portion of the site	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	PHCs, BTEX	Groundwater
Former and current USTs located at 1607 Carling Avenue (Shell RFO)	Eastern portion of the site	Item 28 - Gasoline and Associated Products Storage in Fixed Tanks	PHCs, BTEX	Groundwater

A Phase II ESA was recommended to address the aforementioned APECs.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted on October 8, 2019. The field program consisted of locating and sampling previously installed monitoring wells. At the time of the investigation, two (2) monitoring wells were located.

3.2 Media Investigated

During the subsurface investigation, groundwater samples were obtained and submitted for laboratory analysis. The rationale for sampling and analyzing these samples is based on the Contaminants of Potential Concern identified in the Phase I ESA.

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

Based on the information from NRCAN, bedrock in the area of the site consists of limestone, dolostone, shale, arkose, sandstone of the Ottawa Group. Based on the maps, the thickness of overburden is anticipated to be around 2 m and consists of glacial till. Groundwater is expected to be encountered in the bedrock at around 2m to 3m below the existing ground level.

Contaminants of Potential Concern

As per Section 7.1 of the Phase I ESA report, petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylenes (BTEX) and Polycyclic Aromatic Hydrocarbons (PAHs) were identified as contaminants of potential concern (CPCs) on the subject site.

Existing Buildings and Structures

The subject site is not occupied by any buildings.

Water Bodies

There are no water bodies on the subject property or within the Phase I ESA study area.

Areas of Natural Significance

There are no areas of natural and scientific interest on the subject property or within the Phase I ESA study area.

Drinking Water Wells

Records of 100 water wells, dating from 1949 to 2016, were found in the study area.

One well is recorded on-site and details the water supply well, dated 1956, related to the Aladdin Motel. The nearest off-site wells were recorded monitoring and observation wells at the RFO addressed 1607 Carling Avenue.

Given the municipally supplied area and age of the wells, all private water wells are assumed to be obsolete.

Neighbouring Land Use

Neighbouring land use in the Phase I study area consists of residential and commercial properties. Land use is shown on Drawing PE4229-2 Surrounding Land Use Plan.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 7.1 of the Phase I ESA report, Potentially Contaminating Activities (PCAs) and Areas of Potential Environmental Concern (APEC) were identified within the Phase I ESA Study Area. Thirteen (13) PCAs were identified on the

subject site or in the subject area of which three (3) represented APECs on the Phase I Property and are as follows:

- Former AST in the basement of the historical motel;
- Former UST located at 1619 Carling Avenue;
- Former and current USTs located at 1607 Carling Avenue (Shell retail fuel outlet).

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I ESA is considered to be sufficient to conclude that there are areas of potential environmental concern on the subject site. The presence of potentially contaminating activities was confirmed by a variety of independent sources, and as such, the conclusions of this report are not affected by uncertainty which may be present with respect to the individual sources.

3.4 Deviations from the Sampling and Analysis Plan

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report.

Given that only two wells were sampled for groundwater, no field duplicate or trip blank was tested.

3.5 Impediments

The subject site comprises an active parking lot and as such, it is possible there were serviceable boreholes located beneath parked cars.

In BH03-1, a head of water of 1.08m was recorded which, once purged, was very slow to recharge. As such, it was impractical to collect a 1-litre amber bottle for PAH analysis.

4.0 INVESTIGATION METHOD

4.1 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted at BH01-2 and BH03-1 on October 8, 2019. No water quality parameters were measured in the field at that time.

4.2 Groundwater Sampling

Groundwater sampling protocols were followed using the MECP document entitled “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario”, dated May 1996. Groundwater samples were obtained from each monitoring well, using dedicated sampling equipment. Standing water was purged from each well prior to sampling. Samples were stored in coolers to reduce analyte volatilization during transportation. Details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan in Appendix 1.

4.3 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan, appended to this report, the following soil and groundwater samples were submitted for analysis:

TABLE 2: Groundwater Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameters Analyzed			Rationale
		PHCs (F_1-F_4)	BTEX	PAH	
BH01-2-GW	2.97-6.02 m,	X	X	X	Assess potential impacts from fuel/oil towards the centre of the site.
BH03-1-GW	2.19-3.27 m, Bedrock	X	X		Assess potential impacts from fuel/oil from on and off-site sources.

Paracel Laboratories (Paracel), of Ottawa, Ontario, performed the laboratory analysis on the samples submitted for analytical testing. Paracel is a member of the Standards Council of Canada/Canadian Association for Laboratory Accreditation (SCC/CALA). Paracel is accredited and certified by SCC/CALA for specific tests registered with the association.

4.4 Residue Management

All purge water and fluids from equipment cleaning were retained on-site.

4.5 Quality Assurance and Quality Control Measures

A summary of quality assurance and quality control (QA/QC) measures, including sampling containers, preservation, labelling, handling, and custody, equipment cleaning procedures, and field quality control measurements is provided in the Sampling and Analysis Plan in Appendix 1.

5.0 REVIEW AND EVALUATION

5.1 Geology

Based on information provided in the Previous Engineering Reports the soil profile consists of a pavement structure of gravel overlying fill material, in places underlain by glacial till, followed by weathered bedrock.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on October 8, 2019, using an electronic water level meter. Groundwater levels are summarized below in Table 3. All borehole elevations are relative to a catch basin with a geodetic elevation of 77.55 m asl.

TABLE 3: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH01-2	77.67	2.51	75.16	October 8, 2019
BH03-1	77.56	2.19	75.37	October 8, 2019

As only two wells were located during this investigation, it was not possible to determine the groundwater flow direction or gradient.

Based on the information available in the previous engineering reports, groundwater has been found to flow in a generally west and northwest direction.

5.3 Fine-Coarse Soil Texture

No grain size analysis was completed for the subject site. Coarse-grained standards were chosen.

5.4 Soil Quality

No soil testing has been completed as part of this investigation, however, from the previous engineering reports a significant quantity of soil data is available for the subject site.

Though not identified as a contaminant of concern in the Phase I ESA, in 2001, Golder conducted metals analysis on five soil samples. No exceedances were detected and the soils were deemed to be in compliance with the selected standards.

The "gas/diesel" and "heavy oil" hydrocarbon concentrations identified in the soil samples tested between 2001 and 2008 exceeded applicable standards in four locations tested (BH01-1, BH01-4, BH03-2 and TP-9).

Various PAH concentrations identified in the soil samples tested between 2001 and 2008 exceeded applicable standards in six locations (BH01-1, BH02-1, BH03-2, BH03-5, BH03-6 and BH03-7) tested.

All other parameter concentrations were below applicable standards.

5.5 Groundwater Quality

The results of the analytical testing completed by Kollaard Associates during their "Limited Groundwater Sampling and Testing" program, dated June 2016, are presented below in Table 4a.

Table 4a: Analytical Test Results – Groundwater – BTEX & PHCs (F1-F4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)				MECP Table 7 Standards (µg/L)
		October 6, 2016				
		BH01-2	BH03-1	BH03-2	BH09-5	
Benzene	0.5	nd	nd	nd	**0.9**	0.5
Ethylbenzene	0.5	13.4	0.7	7.8	nd	54
Toluene	0.5	nd	nd	nd	nd	320
Xylenes (Total)	0.5	nd	nd	18.4	nd	72
PHC F1	20	140	**990**	**1,640**	210	420
PHC F2	20	**28,800**	**34,200**	**24,700**	**4,820**	150
PHC F3	50	**27,700**	**29,500**	**25,000**	**4,610**	500
PHC F4	50	nd	nd	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** exceeds MECP Table 7 Standard

All BETX concentrations were in compliance with the MECP table 7 Standards with the exception of Benzene in a sample from BH09-5 (the location of which is unknown) which marginally exceeded the Standard. Two samples (BH03-1 and BH03-2) exceeded the MECP Table 7 Standard for PHC F1, with all four samples exceeding the MECP Table 7 Standard for PHC F2 and F3.

Groundwater samples collected on October 8, 2019, from the monitoring wells in BH01-2 and BH03-1, were submitted for laboratory analysis of PHC (F1-F4) and BTEX. The results of the analytical testing are presented below in Table 4b. The laboratory certificates of analysis are provided in Appendix 1.

Table 4b: Analytical Test Results – Groundwater – BTEX & PHCs (F1-F4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 7 Standards (µg/L)
		October 8, 2019		
		BH01-2	BH03-1	
Benzene	0.5	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	54
Toluene	0.5	nd	nd	320
Xylenes (Total)	0.5	nd	nd	72
PHC F1	25	nd	nd	420
PHC F2	100	**273**	nd	150
PHC F3	100	164	nd	500
PHC F4	100	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** exceeds MECP Table 7 Standard

Concentrations of PHC F2 were in excess of the MECP Table 7 Standard in one sample from BH01-2. With the exception of PHC F3 from the same sample, all other parameters were below the laboratory method detection limit.

A groundwater sample from the monitoring well in BH01-2 was submitted for laboratory analysis of PAHs. The results of the analytical testing are presented below in Table 4c in addition to the PAH testing completed by Kollaard Associates in 2016.

Table 4c: Analytical Test Results – Groundwater – PAH							
Parameter	MDL (µg/L)	Groundwater Samples (µg/L)					MECP Table 7 Standards (µg/L)
		October 6, 2016				Oct 8, 2019	
		BH01-2	BH03-1	BH03-2	BH09-5	BH01-2	
Acenaphthene	0.05-10	7	10	13	2.7	2.64	17
Acenaphthalene	0.05-10	nd	nd	**7**	**1.3**	nd	1
Anthracene	0.01-10	nd	nd	nd	nd	nd	1
Benzo(a)anthracene	0.01-10	nd	nd	nd	nd	nd	1.8
Benzo(a)pyrene	0.01-1	nd	nd	nd	nd	nd	0.81
Benzo(b)fluoranthene	0.05-5	nd	nd	nd	nd	nd	0.75
Benzo(ghi)perylene	0.05-10	nd	nd	nd	nd	nd	0.2
Benzo(k)fluoranthene	0.05-5	nd	nd	nd	nd	nd	0.4
Chrysene	0.05-5	nd	nd	**0.8**	nd	nd	0.7
Bibenzo(ah)anthracene	0.05-10	nd	nd	nd	nd	nd	0.4
Fluoranthene	0.01-10	nd	nd	nd	nd	nd	44
Fluorene	0.05-10	9	20	20	5.7	2.42	290
Indino(123-cd)pyrene	0.05-10	nd	nd	nd	nd	nd	0.2
1-Methylnaphthalene	0.05-10	nd	100	5	3.8	nd	1500
2-Methylnaphthalene	0.05-10	nd	30	2	nd	nd	1500
Naphthalene	0.05-10	nd	**20**	2	0.5	nd	7
Phenanthrene	0.05-10	nd	40	15	5.7	nd	380
Pyrene	0.01-10	nd	nd	**6**	1.4	0.18	5.7

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** exceeds MECP Table 7 Standard

All analytes were in compliance with the MECP table 7 Standards with the exception of acenaphthalene, chrysene, and pyrene in a sample from BH03-2, acenaphthalene in a sample from BH09-5 and naphthalene in a sample from BH03-1.

Analytical test results are presented on Drawing PE4229-5 – Analytical Testing Plan – Groundwater.

5.6 Quality Assurance and Quality Control Results

All samples submitted as part of the October 8, 2019 sampling event were handled in accordance with the Analytical Protocol with respect to preservation method, storage requirement, and container type.

As per Subsection 47(3) of O.Reg. 153/04 as amended by the Environmental Protection Act, a Certificate of Analysis has been received for each sample submitted for analysis and all Certificates of Analysis are appended to this report.

Overall, the quality of the field data collected during this Phase II ESA is considered to be sufficient to meet the overall objectives of this assessment.

5.7 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O.Reg. 269/11 amended by the Environmental Protection Act. Conclusions and recommendations are discussed in a subsequent section.

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

As indicated in the Phase I-ESA report and Section 2.2 of this report, the following PCAs are considered to result in APECs on the Phase I/Phase II Property:

- Former AST in the basement of the historical motel;
- Former UST located at 1619 Carling Avenue;
- Former and current USTs located at 1607 Carling Avenue (Shell retail fuel outlet).

Contaminants of potential concern associated with the aforementioned PCAs include a combination of PHCs (F1-F4), BTEXs and Polycyclic Aromatic Hydrocarbons (PAHs) in the groundwater and/or soil.

Subsurface Structures and Utilities

Underground utilities on the Phase II Property are presumed to include electrical, and sewerage services. Relict private wells and/or septic systems may also be present on the Phase II Property. Any water wells within the Phase I Study Area, are assumed to be obsolete given the municipally supplied nature of the area.

Physical Setting

Site Stratigraphy

The stratigraphy consists of:

- A sporadic gravelled pavement structure consisting of approximately 0.75 m of asphaltic concrete, crushed stone and sand and gravel.
- Approximately 2 m of fill (dark brown clay, silt, sand and gravel with brick fragments).
- A shallow and discontinuous horizon of glacial till (silty sandy gravel)
- Grey Limestone bedrock.

Hydrogeological Characteristics

Groundwater at the Phase II Property was encountered within the bedrock. This unit is interpreted to function as a local aquifer at the subject site.

Water levels were measured at the subject site on October 8, 2019, at depths ranging from 2.19 m and 2.51 m below grade. The groundwater is believed to be flowing in a generally west or northwest direction.

Approximate Depth to Bedrock

From the previous engineering reports, bedrock is present from 0.9 m depth to 2.8 m below the existing grade.

Approximate Depth to Water Table

During this investigation, the depth to the water table at the subject site varied between 2.19 m and 2.51 m below the existing grade. Previous investigations have found groundwater to stand at between 1.9 m and 2.91 m below the existing grade.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) does not apply to the subject site in that the Phase II Property is not within 30m of an environmentally sensitive area.

Section 43.1 of the Regulation does apply to the subject site in that the subject site is a Shallow Soil Property.

Fill Placement

From the previous engineering reports, fill has been identified across the subject site, beneath the parking lot surfacing, to a maximum depth of 2.62 m below grade. Previous analytical testing of fill material has demonstrated that concentrations of metals were within applicable standards. However, PAH and TPH concentrations of fill materials were in excess of applicable standards.

Proposed Buildings and Other Structures

It is our understanding that the Phase II Property will be redeveloped with a multi-storey residential building with a basement (two levels).

Areas of Natural Significance and Water Bodies

No areas of natural significance are present on or within the vicinity of the Phase II Property.

There are no water bodies on the subject property or within the Phase I ESA study area.

Environmental Condition

Areas Where Contaminants are Present

Based on the results of the previous engineering reports, soil impacted with PHC and PAH concentrations exceeding the MECP Table 7 standards, is present across the eastern half of the Phase II Property.

Based on the results of the Phase II ESA, groundwater impacted with Benzene and PHC concentrations exceeding the MECP Table 7 standards, is present across the eastern third of the subject site. Concentrations of several PAHs compounds also marginally exceed the MECP Table 7 standards for groundwater, across the eastern third of the subject site.

Types of Contaminants

The following parameters were identified in the groundwater at concentrations exceeding the MECP Table 7 standards:

- Benzene;
- PHC F1, F2, and F3;
- Acenaphthalene, Chrysene, naphthalene and pyrene.

Contaminated Media

Soils beneath the Phase II Property are impacted with PHC and PAH concentrations exceeding the MECP Table 7 standards.

Groundwater beneath the Phase II Property is impacted with benzene, PHC F1, F2, F3, acenaphthalene, chrysene, naphthalene and pyrene in concentrations exceeding the MECP Table 7 standard.

Known Areas Where Contaminants Are Present

Based on the results from the previous engineering reports, soil impacted with PHC and PAH concentrations exceeding the MECP Table 7 standards is present at BH01-1, BH01-4, BH01-1, BH02-1, BH03-2, BH03-5, BH03-6, BH03-7 and TP-9 generally across the eastern half of the Phase II Property.

Impacted groundwater was identified at BH01-2, BH03-1, BH03-2 and BH09-5 on the eastern third of the site.

Distribution and Migration of Contaminants

The PHC impacts are considered to be limited to the soil and upper layers of the bedrock and groundwater. The PHC and PAH concentrations identified in the soil are considered to have migrated to the groundwater through fluctuations of the groundwater table.

Contaminant distribution is presented in both plan view and cross-section, on Drawings PE4229-4 through PE4229-5.

Discharge of Contaminants

Based on the previous engineering reports, the impacted soil and groundwater is considered to be caused by leakage from either the AST located in the basement of the former motel and/or the historical UST located at 1619 Carling Avenue to the east of the subject site.

Climatic and Meteorological Conditions

In general, climatic and meteorological conditions have the potential to affect contaminant distribution. Two (2) ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants by means of the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally.

The PHC and PAH concentrations identified in the soil are considered to have migrated to the groundwater through fluctuations of the groundwater table. Groundwater flow is considered to have resulted in the lateral migration of the contaminants.

Potential for Vapour Intrusion

There is no potential for vapour intrusion given the site is not currently developed. Remediation of the affected soil and groundwater is expected be conducted in conjunction with any future development.

6.0 CONCLUSIONS

Assessment

A Phase II ESA Update was conducted for 1655 Carling Avenue, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address potentially contaminating activities (PCAs) that were identified during the Phase I ESA and considered to result in areas of potential environmental concern (APECs) on the Phase II Property. The subsurface investigation consisted of sampling groundwater from existing wells.

Information presented in previous engineering reports identified soil impacted with PHC and PAH concentrations exceeding the MECP Table 7 standards, present across the eastern half of the Phase II Property.

Groundwater, impacted with Benzene and PHC concentrations exceeding the MECP Table 7 standards, is present across the eastern third of the subject site. Concentrations of several PAHs compounds also marginally exceed the MECP Table 7 standards for groundwater, across the eastern third of the subject site.

Conclusion

Based on the findings of the Phase II ESA, soil and water have been found to be impacted by PHCs, benzene and PAHs. While the impacted soil and groundwater does pose a liability to the subject land, it is our opinion that it does not pose a risk to the current operation of the property. Given the sources of the contamination (former on-site AST and off-site UST) are no longer present, the groundwater contaminants may naturally degrade over time. If the property is redeveloped in the future, then remediation of the affected soil and groundwater should be conducted in conjunction with redevelopment.

It is expected that groundwater monitoring wells will be abandoned in accordance with O.Reg.903, at the time of construction excavation. It is recommended that the integrity of the monitoring wells be maintained, for possible further groundwater monitoring purposes or that they are decommissioned according to Ontario Regulation Reg. 903 (Ontario Water Resources Act).

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared in general accordance with O.Reg. 153/04 as amended and meets the requirements of CSA Z769-00. The conclusions presented herein are based on information gathered from a limited sampling and testing program. The test results represent conditions at specific test locations at the time of the field program.

The client should be aware that any information pertaining to soils and all test hole logs are furnished as a matter of general information only and test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes themselves.

Should any conditions be encountered at the subject site and/or historical information that differ from our findings, we request that we be notified immediately in order to allow for a reassessment.

This report was prepared for the sole use of Surface Developments. Notification from Surface Developments and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Philip Price, BSc. FGS

Mark S. D'Arcy, P.Eng.

Report Distribution:

- Surface Developments
- Paterson Group

FIGURES

FIGURE 1 - KEY PLAN

DRAWING PE4229-3 – TEST HOLE LOCATION PLAN

DRAWING PE4229-4 – ANALYTICAL TESTING PLAN – SOIL

DRAWING PE4229-5 – ANALYTICAL TESTING PLAN – GROUNDWATER

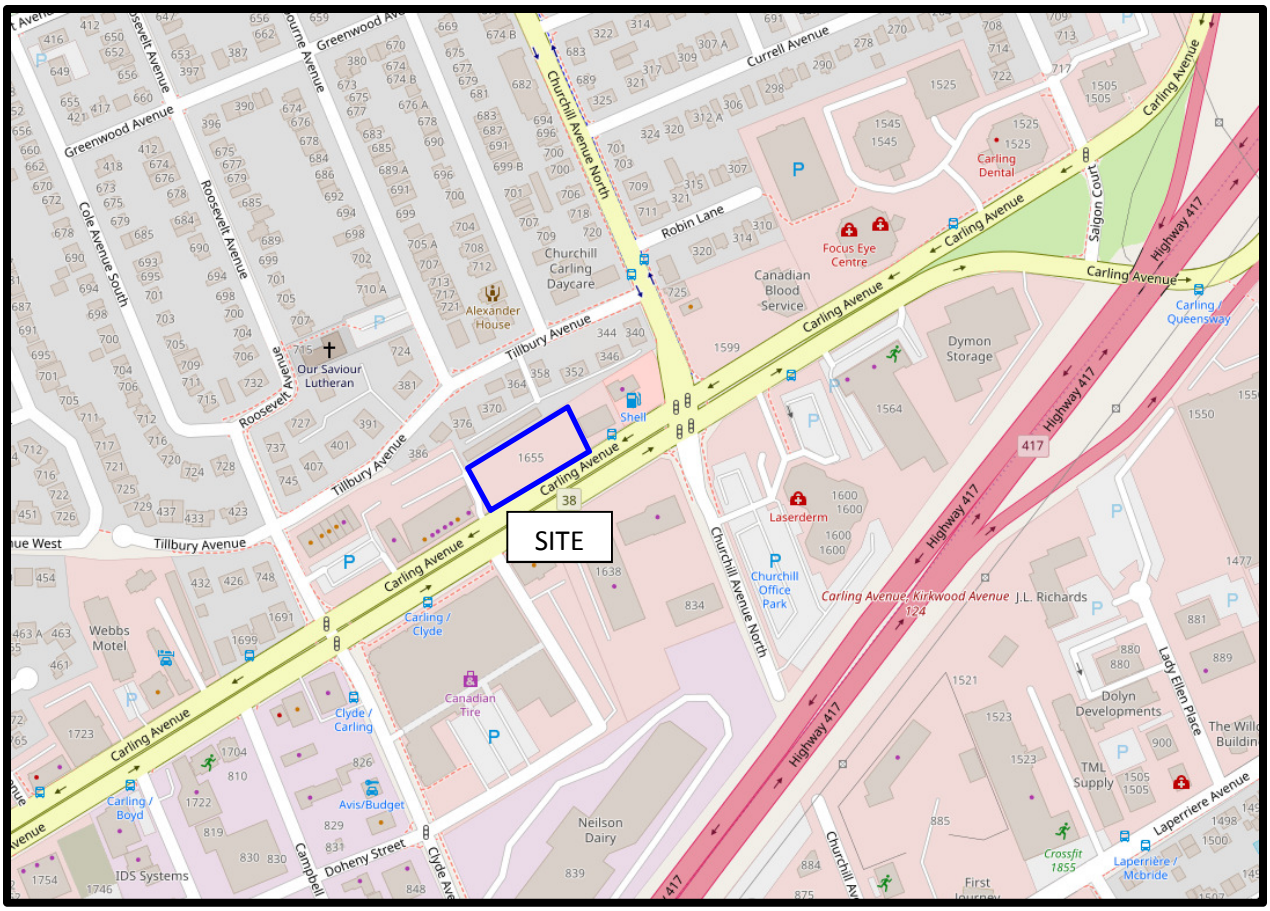
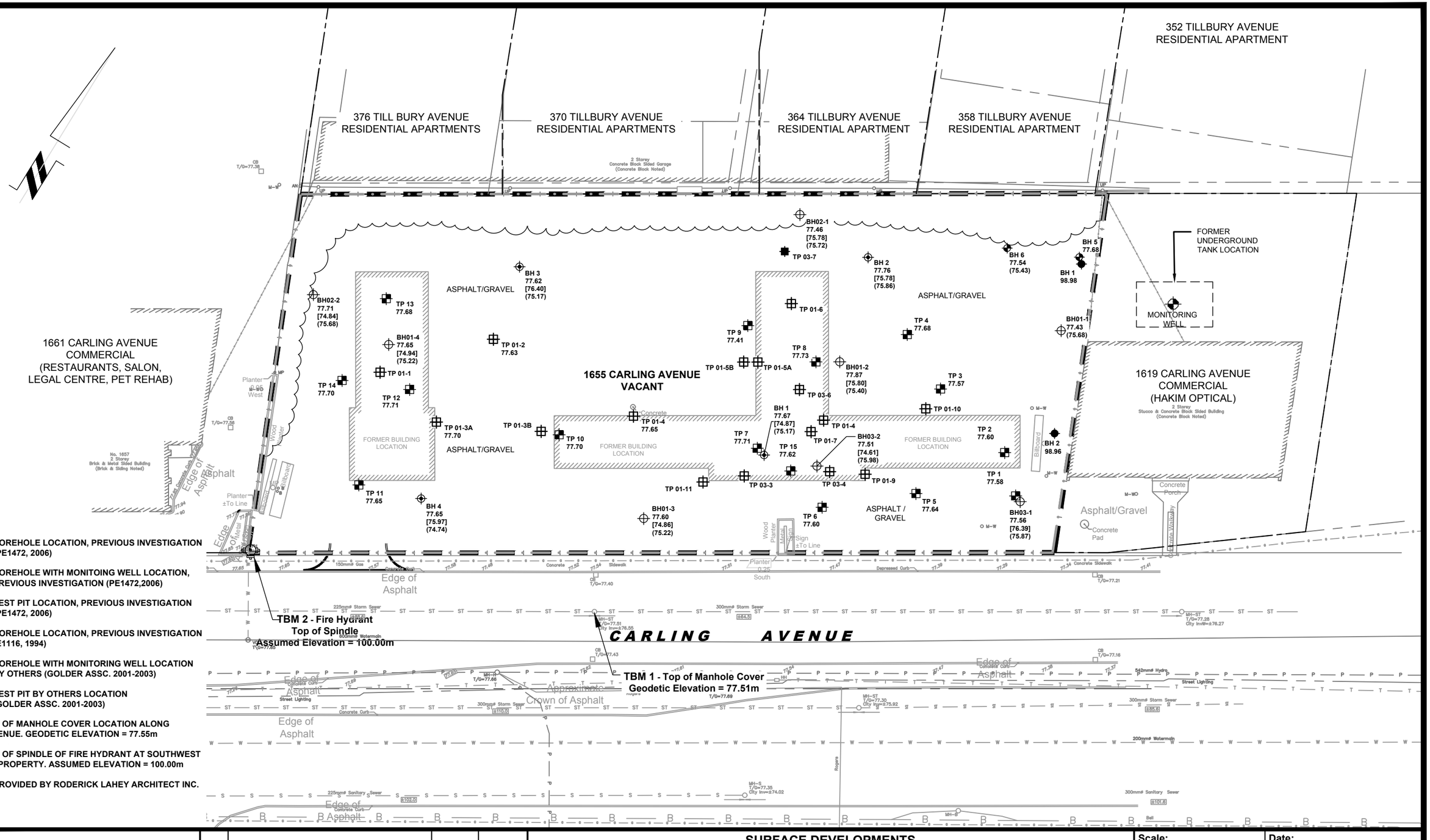


FIGURE 1

KEY PLAN


352 TILLBURY AVENUE
RESIDENTIAL APARTMENT
376 TILL BURY AVENUE
RESIDENTIAL APARTMENTS
370 TILLBURY AVENUE
RESIDENTIAL APARTMENTS
364 TILLBURY AVENUE
RESIDENTIAL APARTMENT
358 TILLBURY AVENUE
RESIDENTIAL APARTMENT
2 Storey
Concrete Block Sided Garage
(Concrete Block Noted)
FORMER
UNDERGROUND
TANK LOCATION
MONITORING
WELL
1661 CARLING AVENUE
COMMERCIAL
(RESTAURANTS, SALON,
LEGAL CENTRE, PET REHAB)
1655 CARLING AVENUE
VACANT
1619 CARLING AVENUE
COMMERCIAL
(HAKIM OPTICAL)
2 Storey
Stucco & Concrete Block Sided Building
(Concrete Block Noted)
No. 1657
2 Storey
Brick & Metal Sided Building
(Brick & Siding Noted)
ASPHALT/GRAVEL
FORMER BUILDING
LOCATION
Asphalt/Gravel
Concrete
Pad
Concrete
Porch
Billboard
Edge of
Asphalt
Planter
±To Line
Wood
Planter
Media
Sign
±To Line
Planter
0.26
South
Planter
0.66
West
Concrete
Sidewalk
Depressed Curb
Concrete Curb
Concrete Block
Wall
Approximate
Crown of Asphalt
ASPHALT /
GRAVEL
CARLING AVENUE
TBM 2 - Fire Hydrant
Top of Spindle
Assumed Elevation = 100.00m
TBM 1 - Top of Manhole Cover
Geodetic Elevation = 77.51m
BH02-1
77.46
[75.78]
(75.72)
BH02-2
77.71
[74.84]
(75.68)
BH 3
77.62
[76.40]
(75.17)
BH 1
77.67
[74.87]
(75.17)
BH 2
77.76
[75.78]
(75.86)
BH 5
77.68
BH 1
98.98
BH 6
77.54
(75.43)
BH01-1
77.43
(75.68)
BH01-2
77.87
[75.80]
(75.40)
BH01-3
77.60
[74.86]
(75.22)
BH01-4
77.65
[74.94]
(75.22)
BH 4
77.65
[75.97]
(74.74)
BH03-1
77.56
[76.39]
(75.87)
BH03-2
77.51
[74.61]
(75.98)
BH 2
98.96
TP 01-1
TP 01-2
77.63
TP 01-3A
77.70
TP 01-3B
TP 01-4
77.65
TP 01-5A
TP 01-5B
TP 01-6
TP 01-7
TP 01-9
TP 01-10
TP 01-11
TP 03-3
TP 03-4
TP 03-6
TP 03-7
TP 1
77.58
TP 2
77.60
TP 3
77.57
TP 4
77.68
TP 5
77.64
TP 6
77.60
TP 7
77.71
TP 8
77.73
TP 9
77.41
TP 10
77.70
TP 11
77.65
TP 12
77.71
TP 13
77.68
TP 14
77.70
TP 15
77.62
MH-ST
T/O=77.51
City Inv=±76.55
MH-ST
T/O=77.28
City Inv=±76.27
MH-ST
T/O=77.30
City Inv=±75.92
MH-S
T/O=77.35
City Inv=±74.02
MH-S
MH-ST
MH
225mm∅ Storm Sewer
300mm∅ Storm Sewer
225mm∅ Sanitary Sewer
300mm∅ Sanitary Sewer
200mm∅ Watermain
300mm∅ Watermain
150mm∅ Gas
542mm∅ Hydro
Street Lighting
Bell
Rogers
CB
T/O=77.40
CB
T/O=77.21
CB
T/O=77.43
CB
T/O=77.16
CB
T/O=77.58
CB
T/O=77.94
CB
T/O=77.85
MH
T/O=77.66
MH-B
±84.5
±110.0
±102.0
±85.6
±101.6
77.65
77.57
77.58
77.48
77.52
77.54
77.51
77.47
77.59
77.29
77.34
77.41
77.85
77.89
77.83
77.81
77.56
77.36
77.37
77.47
77.54
77.69
77.74
77.94
77.90
77.85
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77.35
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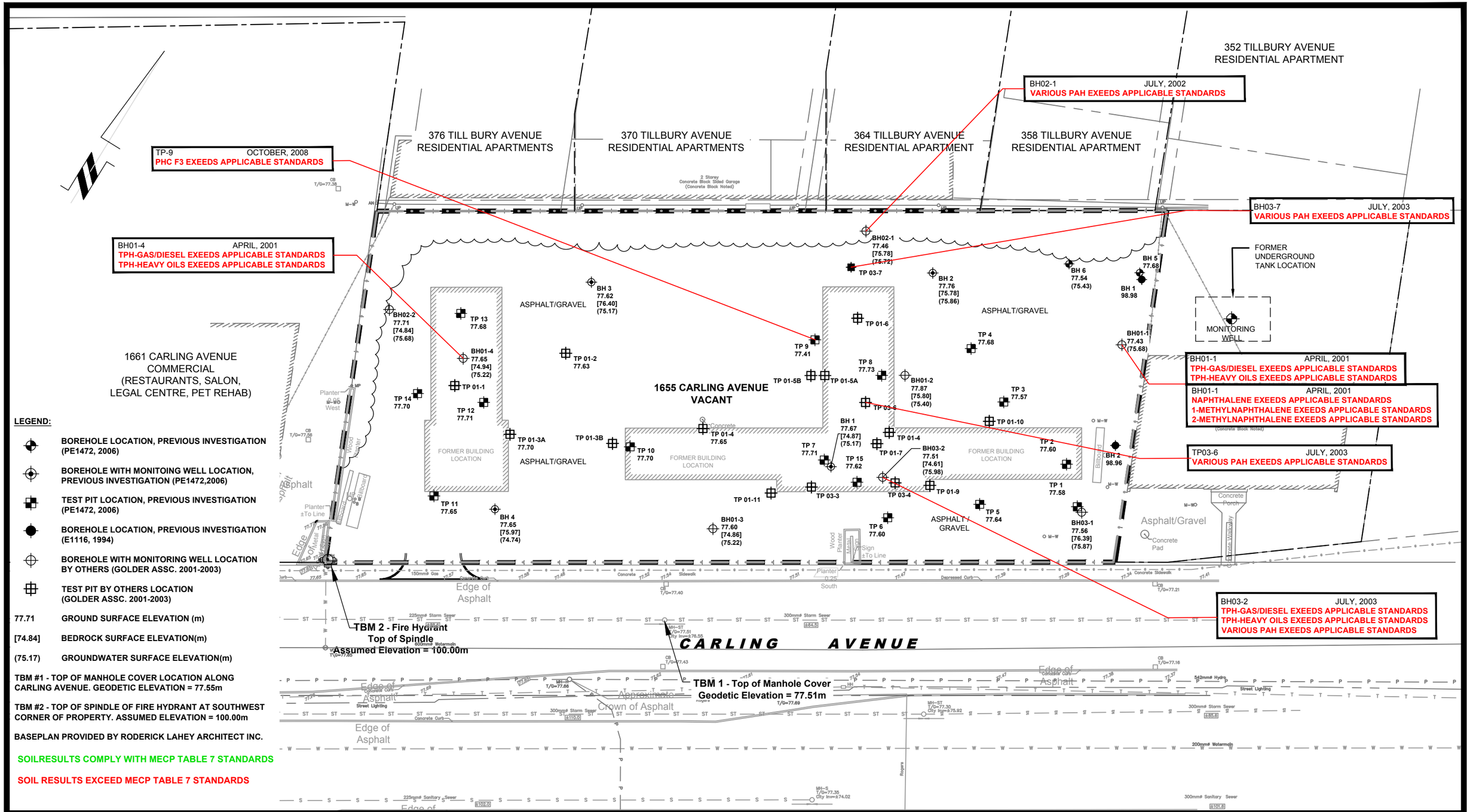
77.29
77.27
77.25
77.23
77.21
77.19
77.17
77.15
77.13
77.11
77.09
77.07



LEGEND:

- BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PE1472, 2006)
- BOREHOLE WITH MONITOING WELL LOCATION, PREVIOUS INVESTIGATION (PE1472,2006)
- TEST PIT LOCATION, PREVIOUS INVESTIGATION (PE1472, 2006)
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION (E1116, 1994)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS (GOLDER ASSC. 2001-2003)
- TEST PIT BY OTHERS LOCATION (GOLDER ASSC. 2001-2003)

77.71 GROUND SURFACE ELEVATION (m)

[74.84] BEDROCK SURFACE ELEVATION(m)

(75.17) GROUNDWATER SURFACE ELEVATION(m)

TBM #1 - TOP OF MANHOLE COVER LOCATION ALONG CARLING AVENUE. GEODETIC ELEVATION = 77.55m

TBM #2 - TOP OF SPINDLE OF FIRE HYDRANT AT SOUTHWEST CORNER OF PROPERTY. ASSUMED ELEVATION = 100.00m

BASEPLAN PROVIDED BY RODERICK LAHEY ARCHITECT INC.

SOILRESULTS COMPLY WITH MECP TABLE 7 STANDARDS

SOIL RESULTS EXCEED MECP TABLE 7 STANDARDS

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SURFACE DEVELOPMENTS

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1655 CARLING AVENUE

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:400	Date: 10/2019
Drawn by: RCG	Report No.: PE4229-2
Checked by: PP	Dwg. No.: PE4229-4
Approved by: MSD	Revision No.:

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352 TILLBURY AVENUE
RESIDENTIAL APARTMENT

376 TILL BURY AVENUE
RESIDENTIAL APARTMENTS

370 TILLBURY AVENUE
RESIDENTIAL APARTMENTS

364 TILLBURY AVENUE
RESIDENTIAL APARTMENT

358 TILLBURY AVENUE
RESIDENTIAL APARTMENT

1661 CARLING AVENUE
COMMERCIAL
(RESTAURANTS, SALON,
LEGAL CENTRE, PET REHAB)

1655 CARLING AVENUE
VACANT

1619 CARLING AVENUE
COMMERCIAL
(HAKIM OPTICAL)

FORMER
UNDERGROUND
TANK LOCATION

MONITORING
WELL

ASPHALT/GRAVEL

FORMER BUILDING
LOCATION

Edge of
Asphalt

Approximate
Crown of Asphalt

Concrete
Porch

Asphalt/Gravel
Concrete
Pad

ASPHALT /
GRAVEL

Billboard

Planter
o Line

Planter
South

Wood
Planter

Media
Sign
±To Line

Sign

Concrete
Curb

Concrete
Sidewalk

Depressed Curb

Street Lighting

Rogers

Bell

CARLING AVENUE

BH02-1
77.46
[75.78]
(75.72)

BH02-2
77.71
[74.84]
(75.68)

BH 3
77.62
[76.40]
(75.17)

BH 1
77.67
[74.87]
(75.17)

BH 2
77.76
[75.78]
(75.86)

BH 6
77.54
(75.43)

BH 5
77.68

BH 1
98.98

BH01-1
77.43
(75.68)

BH 2
98.96

BH01-2
77.87
[75.80]
(75.40)

BH01-4
77.65
[74.94]
(75.22)

BH 4
77.65
[75.97]
(74.74)

BH01-3
77.60
[74.86]
(75.22)

BH03-1
77.56
[76.39]
(75.87)

BH03-2
77.51
[74.61]
(75.98)

TP 01-1
TP 01-2
77.63
TP 01-3A
77.70
TP 01-3B
TP 01-4
77.65
TP 01-5A
TP 01-5B
TP 01-6
TP 01-7
TP 01-9
TP 01-10
TP 01-11
TP 03-3
TP 03-4
TP 03-6
TP 03-7
TP 1
77.58
TP 2
77.60
TP 3
77.57
TP 4
77.68
TP 5
77.64
TP 6
77.60
TP 7
77.71
TP 8
77.73
TP 9
77.41
TP 10
77.70
TP 11
77.65
TP 12
77.71
TP 13
77.68
TP 14
77.70
TP 15
77.62

TBM 2 - Fire Hydrant
Top of Spindle
Assumed Elevation = 100.00m

TBM 1 - Top of Manhole Cover
Geodetic Elevation = 77.51m

BH01-2 6 Oct, 2016

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F2	28800	150
PHC F3	27700	500

BTEX, PHCs (F1 and F4) PAH comply with MECP Table 7 Standards

BH01-2 8 Oct, 2019

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F2	273	150

BTEX, PHCs (F1, F3 and F4), PAH comply with MECP Table 7 Standards

BH03-1 6 Oct, 2016

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F1	990	420
PHC F2	34200	150
PHC F3	29500	500
Naphthalene	20	7

BTEX, PHCs (F4) comply with MECP Table 7 Standards

BH03-2 6 Oct, 2016

PARAMETER	RESULT(µg/L)	STANDARD(µg/L)
PHC F1	1640	420
PHC F2	24700	150
PHC F3	25000	500
Acenaphthalene	7	1
Chrysene	0.8	0.7
Pyrene	6	5.7

BTEX, PHCs (F4) comply with MECP Table 7 Standards

LEGEND:

- BOREHOLE LOCATION, PREVIOUS INVESTIGATION (PE1472, 2006)
- BOREHOLE WITH MONITOING WELL LOCATION, PREVIOUS INVESTIGATION (PE1472,2006)
- TEST PIT LOCATION, PREVIOUS INVESTIGATION (PE1472, 2006)
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BASEPLAN PROVIDED BY RODERICK LAHEY ARCHITECT INC.

GROUNDWATER RESULTS COMPLY WITH MECP TABLE 7 STANDARDS

GROUNDWATER RESULTS EXCEED MECP TABLE 7 STANDARDS

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
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NO.	REVISIONS	DATE	INITIAL

SURFACE DEVELOPMENTS

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1655 CARLING AVENUE

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN-GROUNDWATER

Scale: 1:400	Date: 10/2019
Drawn by: RCG	Report No.: PE4229-2
Checked by: NS	Dwg. No.: PE4229-5
Approved by: MSD	Revision No.:

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

LABORATORY CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

Paterson Group Inc.

Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

patersongroup

Sampling & Analysis Plan

Phase II Environmental Site Assessment
1655 Carling Avenue
Ottawa, Ontario

Prepared For

Surface Developments

September 30, 2019

Report: PE4229-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Surface Developments to conduct a Phase II Environmental Site Assessment (ESA) Update at the property addressed 1655 Carling Avenue, in the City of Ottawa, Ontario. Based on Phase I ESA completed for the subject property, a groundwater sampling program was developed, consisting of sampling pre-existing wells across the subject site.

Borehole	Location	Rationale
BH01-1 to BH01-4	Located across the subject site.	Sampling to categorize the general groundwater condition across the site.
BH02-1 to BH02-2	Located towards the north and west of the site.	Sampling to categorize the general groundwater condition in the north and west of the site.
BH03-1 to BH03-2	Located towards the southeast and centre of the site.	Sampling to categorize the general groundwater condition in the southeast and centre of the site, particularly the location of the former AST.
BH1 to BH5	Located across the subject site.	Sampling to categorise the general groundwater condition across the site.

2.0 ANALYTICAL TESTING PROGRAM

The analytical testing program for groundwater should ensure that parameters analyzed are consistent with the Contaminants of Concern identified in the Phase I ESA.

3.0 STANDARD OPERATING PROCEDURES

3.1 Monitoring Well Sampling Procedure

Equipment

- ❒ Water level metre or interface probe on hydrocarbon/LNAPL sites
- ❒ Spray bottles containing water and methanol to clean water level tape or interface probe
- ❒ Peristaltic pump
- ❒ Polyethylene tubing for peristaltic pump
- ❒ Flexible tubing for peristaltic pump
- ❒ Latex or nitrile gloves (depending on suspected contaminant)
- ❒ Allen keys and/or 9/16” socket wrench to remove well caps
- ❒ Graduated bucket with volume measurements
- ❒ pH/Temperature/Conductivity combo pen
- ❒ Laboratory-supplied sample bottles

Sampling Procedure

- ❒ Locate well and use a socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- ❒ Measure water level, with respect to the existing ground surface, using water level meter or interface probe. If using an interface probe on suspected NAPL site, measure the thickness of the free product.
- ❒ Measure the total depth of well.
- ❒ Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- ❒ Calculate the volume of standing water within well and record.
- ❒ Insert polyethylene tubing into well and attach to the peristaltic pump. Turn on the peristaltic pump and purge into the graduated bucket. Purge at least three well volumes of water from the well. Measure and record field chemistry. Continue to purge, measuring field chemistry after every well volume. Purge, until appearance or field chemistry stabilizes.
- ❒ Note the appearance of purge water, including colour, opacity (clear, cloudy, silty), sheen, presence of LNAPL, and odour. Note any other unusual features (particulate matter, effervescence (bubbling) of dissolved gas, etc.).
- ❒ Fill the required sample bottles. If sampling for metals, attach 75-micron filter to discharge tube and filter metals sample. If sampling for VOCs, use low flow rate to ensure a continuous stream of non-turbulent flow into sample bottles. Ensure no headspace is present in VOC vials.
- ❒ Replace well cap and flushmount casing cap.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The QA/QC program for this Phase II ESA is as follows:

- ❒ All non-dedicated sampling equipment (water level metre or interface probe) will be decontaminated according to the procedure above.

- ❒ All groundwater sampling equipment is dedicated (polyethylene and flexible peristaltic tubing is replaced for each well).

- ❒ Where groundwater samples are to be analyzed for VOCs, one laboratory-provided trip blank will be submitted for analysis with every laboratory submission.

- ❒ Approximately one (1) field duplicate will be submitted for every ten (10) samples submitted for laboratory analysis. A minimum of one (1) field duplicate per project will be submitted.

- ❒ Where combo pens are used to measure field chemistry, they will be calibrated on an approximately monthly basis, according to the frequency of use.

5.0 DATA QUALITY OBJECTIVES

The purpose of setting data quality objectives (DQOs) is to ensure that the level of uncertainty in data collected during the Phase II ESA is low enough that decision-making is not affected, and that the overall objectives of the investigation are met.

The quality of data is assessed by comparing field duplicates with original samples. If the relative percent difference (RPD) between the duplicate and the sample is within 20%, the data are considered to be of sufficient quality so as not to affect decision-making. The RPD is calculated as follows:

$$RPD = \left| \frac{x_1 - x_2}{(x_1 + x_2)/2} \right| \times 100\%$$

Where x_1 is the concentration of a given parameter in an original sample and x_2 is the concentration of that same parameter in the field duplicate sample.

For the purpose of calculating the RPD, it is desirable to select field duplicates from samples for which parameters are present in concentrations above laboratory detection limits, i.e. samples which are expected to be contaminated. If parameters are below laboratory detection limits for selected samples or duplicates, the RPD may be calculated using a concentration equal to one half (0.5 x) the laboratory detection limit.

It is also important to consider data quality in the overall context of the project. For example, if the DQOs are not met for a given sample, yet the concentrations of contaminants in both the sample and the duplicate exceed the MOE site remediation standards by a large margin, the decision-making usefulness of the sample may not be considered to be impaired. The proximity of other samples which meet the DQOs must also be considered in developing the Phase II Conceptual Site Model; often there are enough data available to produce a reliable Phase II Conceptual Site Model even if DQOs are not met for certain individual samples.

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

- ❒ Insufficient groundwater volume for groundwater samples
- ❒ Breakage of sampling containers following sampling or while in transit to the laboratory
- ❒ Elevated detection limits due to matrix interference (generally related to matrix colour or presence of organic material)
- ❒ Elevated detection limits due to high concentrations of certain parameters, necessitating dilution of samples in the laboratory

Site-specific impediments to the Sampling and Analysis Plan are discussed in the body of the Phase II ESA report.

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Ottawa, ON, K1G 4J8
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www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Philip Price

Client PO: 27627
Project: PE4229
Custody: 123194

Report Date: 9-Oct-2019
Order Date: 8-Oct-2019

Order #: 1941235

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1941235-01	BH01-2
1941235-02	BH03-2

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 27627

Report Date: 09-Oct-2019
Order Date: 8-Oct-2019
Project Description: PE4229

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	9-Oct-19	9-Oct-19
PHC F1	CWS Tier 1 - P&T GC-FID	9-Oct-19	9-Oct-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	9-Oct-19	9-Oct-19
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	8-Oct-19	9-Oct-19

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 27627

Report Date: 09-Oct-2019

Order Date: 8-Oct-2019

Project Description: PE4229

	Client ID:	BH01-2	BH03-2	-	-
	Sample Date:	08-Oct-19 12:00	08-Oct-19 12:00	-	-
	Sample ID:	1941235-01	1941235-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	-	-
Toluene-d8	Surrogate	93.7%	82.0%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	273	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	164	<100	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	-	-
Semi-Volatiles					
Acenaphthene	0.05 ug/L	2.64	-	-	-
Acenaphthylene	0.05 ug/L	<0.05	-	-	-
Anthracene	0.01 ug/L	<0.01	-	-	-
Benzo [a] anthracene	0.01 ug/L	<0.01	-	-	-
Benzo [a] pyrene	0.01 ug/L	<0.01	-	-	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	-	-	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	-	-	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	-	-	-
Chrysene	0.05 ug/L	<0.05	-	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	-	-	-
Fluoranthene	0.01 ug/L	<0.01	-	-	-
Fluorene	0.05 ug/L	2.42	-	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	-	-	-
1-Methylnaphthalene	0.05 ug/L	<0.05	-	-	-
2-Methylnaphthalene	0.05 ug/L	<0.05	-	-	-
Methylnaphthalene (1&2)	0.10 ug/L	<0.10	-	-	-
Naphthalene	0.05 ug/L	<0.05	-	-	-
Phenanthrene	0.05 ug/L	<0.05	-	-	-
Pyrene	0.01 ug/L	0.18	-	-	-
2-Fluorobiphenyl	Surrogate	94.1%	-	-	-
Terphenyl-d14	Surrogate	95.8%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*75.9*		*ug/L*		*94.9*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*76.4*		*ug/L*		*95.5*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1740	25	ug/L		87.2	68-117			
F2 PHCs (C10-C16)	1590	100	ug/L		99.4	60-140			
F3 PHCs (C16-C34)	4270	100	ug/L		109	60-140			
F4 PHCs (C34-C50)	2510	100	ug/L		101	60-140			
Volatiles									
Benzene	41.4	0.5	ug/L		104	60-130			
Ethylbenzene	34.4	0.5	ug/L		86.0	60-130			
Toluene	36.6	0.5	ug/L		91.5	60-130			
m,p-Xylenes	76.1	0.5	ug/L		95.2	60-130			
o-Xylene	35.8	0.5	ug/L		89.4	60-130			
Surrogate: Toluene-d8	*69.0*		*ug/L*		*86.3*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL | TR RE RE
LABORATORIES LTD.

Paracel ID: 1941235

ad Office
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awa, Ontario K1G 4J8
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aracel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 123194

Page __ of __

Client Name: Paterson	Project Reference: PE4229	**Turnaround Time:**
Contact Name: Phil, Price	Quote #	☑ 1 Day ☐ 3 Day
Address: 154 Colonnade Rd	PO # 27627	☐ 2 Day ☐ Regular
Telephone: 613 226 7381	Email Address:	Date Required:

Criteria: ☑ O. Reg. 153/04 (As Amended) Table __ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1941235

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)							
1	BH01-2	W		4	8 Oct	PM	/		/											/
2	BH03-1	W		3	8 Oct	PM	/													/
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments: JD redd - BH01-2 6'W, BH03-1 6'W.
Report as per COC. ORSON

Method of Delivery: Parcel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): PHILIP PRICE	Date/Time: 08/10/19 3:30	Date/Time: OCT 08 2019 04:45	Date/Time: 10 08 19 6
Date/Time: 8 Oct 2019 2:30 pm	Temperature: °C PM	Temperature: 18.3 °C	pH Verified [ ] By: